

We claim:

1. A computer-readable medium having a computer program to control a gliding vehicle, the computer program comprising:

means for determining a homing guidance acceleration term for the gliding vehicle

5 based on a selected arrival velocity orientation and desired final target coordinates;

means for determining a bias term to cancel gravity acceleration and to control time-of-flight of the gliding vehicle;

means for determining an energy management term to fly the gliding vehicle along an optimal flight path to conserve energy; and,

10 means for determining a composite commanded acceleration for the gliding vehicle based on a component blending gain, the homing guidance acceleration term, the bias term, and the energy management term.

2. The medium of claim 1, further comprising means for gliding the gliding vehicle based on the commanded acceleration determined.

15 3. The medium of claim 1, wherein the means for determining the homing guidance acceleration term periodically redetermines the homing guidance acceleration term as at least one of the desired final target coordinates and a commanded final velocity orientation are updated, and as vehicle conditions change.

4. The medium of claim 1, wherein the means for determining the homing guidance acceleration term determines the homing guidance acceleration term as normal to a current vehicle velocity orientation.
5. The medium of claim 1, wherein the means for determining the bias term iteratively determines the bias term as a predicted time-of-flight of the gliding vehicle changes.
6. The medium of claim 1, wherein the means for determining the bias term determines a first bias term to cancel the gravity acceleration of the gliding vehicle, and a second bias term to control the time-of-flight of the gliding vehicle.
7. The medium of claim 1, wherein the means for determining the bias term controls the time-of-flight of the gliding vehicle by correcting for factors unknown at launch of the gliding vehicle.
8. The medium of claim 7, wherein the factors unknown at the launch of the gliding vehicle comprise at least one of: rocket motor variations, drag variations, and unknown winds.
- 15 9. The medium of claim 1, wherein the means for determining the energy management term periodically redetermines the energy management term as vehicle conditions change.

10. The medium of claim 1, wherein the means for determining the energy management term determines the energy management term relative to an Earth local tangent frame having an x-axis aligned with a current bearing of the gliding vehicle and a z-axis aligned with a local gravity vector.

5      11. The medium of claim 10, wherein the means for determining the commanded acceleration utilizes a transformation from the Earth local tangent frame to a first desired reference frame, a second desired reference frame providing reference for definition of the commanded acceleration.

10     12. The medium of claim 1, wherein the means for determining the command acceleration periodically redetermines the commanded acceleration as at least one of the homing guidance acceleration term, the bias term, and the energy management term change.

13. The medium of claim 1, wherein the means for determining the command acceleration determines the commanded acceleration within a desired reference frame.